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FACTS



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Minister

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Deputy Minister

about pesticides

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BENEFICIAL INSECTS

It is extremely difficult to try to estimate the value of beneficial insects to man. One value set for the United States places the pollinating benefits of insects at \$4 1/2 billion annually, and commercial products derived from insect activities, worth another \$144 million annually.

Examples of ways in which insects are beneficial are:

1. Through the production or collection of useful products. Examples of these are the saliva of the silkworm for silk, and a gland secretion of the honeybee for beeswax. Honey is nectar assembled from blossoms, concentrated, modified chemically and then sealed in wax by the honeybee. Tannic acid from insect galls has been used to tan the skins of animals for leather. Some insect galls contain materials for dyes.
2. Most of our fruits, vegetables, ornamental plants, and clover require an insect, usually a bee, to pollinate the flower before the fruits can develop.
3. Insects are food for game fish, song and game birds, chickens and turkeys, and a few wild animals such as raccoons.
4. Insects improve the texture and aeration of soil by burrowing through it, i.e. the nymphs of cicadas. Their decaying bodies and droppings add nutrients to the soil.
5. Insects feed on dead plants and animals, assisting in the decomposition of material which could potentially be a menace to health. These decaying plants or animals are converted into simpler substances which can be used as food for growing plants.
6. Many insects have been extremely important in scientific investigations. Probably the best known of these is the drosophila fly in the study of modern genetics. Also, valuable lessons in other fields of study have benefited from the use of insects, such as sociology, psychology and the principles of polyembryony (more than one offspring from one embryo) and



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parthenogenesis (reproduction by development of an unfertilized egg).

7. Insects can be used for their beauty. Many ornaments in jewelry are made from insects, while the shapes, colours and patterns are used as models for artists, decorators and milliners.
8. Insects have been beneficial in destroying various weeds in very much the same way as other insects attack crop plants, i.e. cactoblastis cactorum (moth borer) vs. prickly pear plant. Unfortunately, many of these insects may depart their weed hosts and adapt themselves almost exclusively to a new and valuable food plant.
9. Many insects destroy other injurious insects. This is a very important factor in keeping down the populations of pest species.

Entomophagous (insect eating) insects are of two general sorts, predators and parasitoids.

Predators feed on smaller or weaker insects and live apart from their prey, while parasitoids live in or on the bodies of their host.

Examples of predacious insects include: dragonflies and damselflies which feed on mosquitoes and moths. Ground beetles and tiger beetles feed on many insects, such as the gypsy moth, while the ladybird beetle and lacewing eat aphids.

Some of the wasps are important predators of grasshoppers and caterpillars.

Some stink bugs feed on caterpillars while praying mantids feed on a large variety of insects.

Among the flies, robber flies, dance flies and long-legged flies are examples of predators. The syrphid fly larva is an important predator of aphids.

Most of the parasitoid insects that attack other insects are in the orders Diptera (Flies) or Hymenoptera (Bees and Wasps). Among the Diptera the most important parasitoid is the tachinid fly, which resembles an overgrown housefly. The adults are found chiefly resting on foliage or about flowers upon which they feed. Eggs of this fly are glued to the skin of the caterpillars. On hatching, the larvae feed on the muscle or fat tissue of the caterpillar. The larvae then leaves the host to pupate nearby. An insect attacked by a tachinid invariably is killed. Tachinid flies are extremely beneficial in the control of armyworms and European corn borers.

A careful study should be conducted before any spray programme is instigated. It is important to distinguish between insect friends and insect enemies before applying an insecticide. Each person should attempt to learn some of the ways in which beneficial insects affect the complex interrelationship of plant and animal life to his advantage.

The following are some of the beneficial aspects of insects:

1. Ambush bug: These bugs are able to catch large insects even as large as bumblebees. They feed mainly on bees, wasps and flies.
2. Braconidae: Many of these pupate in silken cocoons on the outside of the body of their host. They are parasitoids of the European corn borer, leaf mining sawflies and bark beetles.
3. Bumblebee: These are extremely valuable to farmers in pollinating red clover.

Honeybee: All know the products, honey and beeswax. Four billion dollars a year economic value is attributed to their pollination activities.
4. Caddis fly: The adults feed principally on liquid foods. Of the larvae, the free-living caddisfly larvae are generally predacious in aquatic habitats.
5. Carrion beetle: These beetles dig the soil from beneath dead birds, mice etc. until the latter are completely buried and then lay eggs upon them so that the larvae may feed in seclusion.
6. Cuckoo wasp: These insects are external parasitoids of full-grown wasp or bee larvae.
7. Damsel bug: These bugs are predacious on many bugs, especially aphids and small caterpillars.
8. Damselfly: The nymphs feed on mosquito larvae and the adults on mosquitoes and moths.
9. Dragonfly: The nymphs of the dragonfly feed on mosquito larvae and the adults feed on mosquitoes and moths.
10. Flower Flies: The adults are important pollinizers but the economic importance of the family arises largely from the predacious habits of the larvae of many species which feed on aphids and other small soft-bodied insects.
11. Giant Silkworm moth: The cocoons are very dense and many of the oriental species yield silk in commercial quantities. Shantung silk, tussah silk and muga silk are derived from different caterpillars of this family.
12. Ground beetle: Both the larvae and adults feed on a variety of insects.
13. Ichneumons: These insects are parasitoids of other insects or invertebrates (i.e. they attack wood wasps, horntails, sawflies and lepidopterous larvae).
14. Lacewings: The larvae of Neuroptera are predacious, as are many of the adults. The Dobsonfly is the largest here.

15. Lady bird beetle: The adult and larvae feed on aphids.
16. Mayfly: These are very common about ponds or streams. They often emerge in enormous numbers from lakes and rivers. Both young and adults are extremely important as food for fish.
17. Milkweed butterfly: The most common member of this family is the Monarch butterfly. The larvae feed on milkweed. Its annual migration in large numbers attract the attention of many tourists.
18. Praying Mantis: Mantids are the only insects that can "look over their shoulders". They usually lie in wait for their prey with the front legs in an upraised position; giving rise to the common name "praying mantid".
19. Predacious diving beetle: This is a large group of aquatic beetles that are usually very common in ponds and quiet streams. Both adults and larvae are highly predacious and feed on a variety of small aquatic animals.
20. Scarab beetle: These beetles hasten the decomposition of dung or feed on decomposing plant material and carrion.
21. Sphecoid Wasps: These are digger wasps and mud daubers. Each egg is deposited on a caterpillar or other insect (such as Cicada) which has been paralyzed by stinging and stored in a nest dug in the ground. Nests are often found in a hollowed stem of a plant or fashioned of mud and suspended from the underside of a bridge.
22. Spider wasp: The larvae of most species feed on spiders. They capture and paralyze a spider and then prepare a cell for it in the ground.
23. Stone fly: These insects are found near streams or rocky lake shores. Some species are predacious in the nymphal stage. They are also food for fish.
24. Tachinid fly: This family is the second largest in the order and its members are to be found almost everywhere. It is a very valuable group, as the larval stages are parasitoids of other insects, and aid in keeping pest species in check.
25. Tiger beetles: Both the adult and larvae feed on a wide variety of insects.
26. Water boatmen: Some species are said to eat larvae of mosquitoes, but probably their chief food is algae or the ooze from the bottom of ponds.
27. Water Scavenger beetle: These beetles resemble predacious diving beetles but live on decaying organic matter in water.
28. Water Strider: The food of the nymphs and adults consist of living and dead floating insects and other animals.